CALIFORNIA
ENERGY
COMMISSION

GULF COAST TO CALIFORNIA PIPELINE FEASIBILITY STUDY

COMMITTEE REPORT

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TABLE OF CONTENTS

Introduction 3

Background…… ..... …4

Study Findings…… 5

Existing Pipeline Systems…… 5

Issues Associated with a Gulf Coast-to-California Pipeline…….....7

Gulf Coast-to-California Pipeline Features and Cost….....9

Gulf Coast-to-California Pipeline as a Strategic Fuel Reserve…… 11

Other Pipeline Projects That Could Indirectly Benefit California's Motor Fuel Supply…… 11

Conclusions and Recommendations…….....13

Figures

Figure 1: Existing Pipeline Systems…….....6

Figure 2: Gulf Coast-to-California Pipeline Conceptual Route…… 10

Introduction

The California Energy Commission prepared this report to summarize its investigation of the feasibility of a new or expanded pipeline for delivery of additional transportation fuel supplies to California from the U.S. Gulf Coast.

The California Legislature directed the Energy Commission, in consultation with the State Fire Marshal, to conduct a study to determine if such new pipeline capacity should be pursued (Assembly Bill 2098, Migden, Chapter 963, Statutes of 2000). Specifically, the legislation called for a study of the feasibility of financing, constructing, and maintaining a new pipeline, or utilizing or expanding the capacity of existing pipelines, to transport motor vehicle fuel or its components from the Gulf Coast to California.

The Energy Commission contracted with Interliance, LLC of Costa Mesa to prepare a feasibility study for a Gulf Coast-to-California pipeline. Interliance's report, *Gulf Coast to California Pipeline Feasibility Study* (March 2002), is separately available as an Energy Commission consultant report (publication number P600-02-010DCR). The Energy Commission also contracted with Drew Laughlin to assess the following two related subjects:

(1) the outlook for availability of petroleum products for potential transport to California via such a pipeline, and

(2) the economics and availability of the marine tanker fleet to deliver more petroleum products to California in lieu of pipeline transport.

Laughlin's reports, *Supply Potential for Petroleum Products in the USGC,* and *Marine Product Tanker Fundamentals, Economics and Outlook* (both March 2002) are also available as separate reports.

This report summarizes results of the above consultant studies and presents the Energy Commission's findings and recommendation on this subject. It is the Energy Commission's determination that constructing a pipeline from the Gulf Coast is not a viable option for supplying motor fuels to California at this time. Other Western Region pipeline projects identified in the study could, however, indirectly increase motor fuel supplies available to the California market.

Background

California faces a growing gap between its demand for motor vehicle fuels (primarily gasoline) and the capability of the state's own petroleum refineries to supply this demand. California's demand for gasoline is expected to grow at an annual rate of 1.3 to 3 percent over the next 10 years. During the same period, California refinery production is expected to grow at an annual rate of only about one percent or less.

The phaseout of MTBE by the end of 2003 will also have an impact on the gasoline supply situation. MTBE use as a gasoline oxygenate additive has amounted to nearly 10 percent of California's gasoline supply prior to 2003. Its phaseout and replacement with ethanol by the end of 2003 will create an incremental supply gap, since ethanol can presently be used at only 6 percent and its addition prevents use of some other gasoline components to meet fuel vapor pressure requirements in summer months.

At the same time, the state is a net exporter of motor fuels, with refineries in California supplying gasoline and distillate fuels (diesel and jet fuel) for the majority of Nevada's and Arizona's growing markets. Limited prospects for additional in-state refining capacity means that sources of refined motor fuels from outside the state will become increasingly necessary to serve California's market demand and the demands of neighboring markets.

Refineries on the U.S. Gulf Coast are currently the largest suppliers of the nation's motor fuels, and refineries in this region may have potential to provide additional supplies to meet the western states' growing needs. A pipeline from Texas currently supplies part of the Arizona gasoline market. Some petroleum products from the Gulf Coast are supplied to California on an intermittent basis by marine vessel. Any additional volumes of motor fuels from Gulf Coast refineries that could be available to the California market and the other markets now supplied mostly from California refineries could potentially reduce California's supply/demand gap. Thus, the question arises of whether new pipeline capacity for delivering petroleum products from the Gulf Coast to California and/or other western states is warranted.

California's current petroleum product balance can be summarized as follows (based on data for 2000, the latest year for which complete data are available): California refineries produced an average of 1,584 thousand barrels per day (TBD) of gasoline and distillate fuels. This in-state production was supplemented with 138 TBD of marine imports, from both foreign and domestic sources, resulting in a total product supply of 1,722 TBD. California consumption was 1,442 TBD, with the balance of 280 TBD being exported to other states. California's exports included 146 TBD to Nevada, virtually all of that state's usage. Another 126 TBD was supplied to Arizona, representing about half of that state's demand, and the balance went to Oregon and various other out-of-state locations.

Thus, California supplies petroleum products to Arizona and Nevada in volumes equal to nearly 20 percent of California's own consumption. In theory, some portion of this

volume could be retained for use in California if transport capacity to supply these other markets from the Gulf Coast was expanded and supply was available. Furthermore, a pipeline that could supply Gulf Coast petroleum products all the way to California would provide a more direct supply option to the state than the current marine transport route via the Panama Canal.

The combination of growing demand and decreased in-state supplies means that California's near-term need for gasoline and blending component imports will increase by an estimated 56 to 94 TBD. This need for additional imports could exceed 100 TBD if demand is beyond the forecast range, the refinery production impact of MTBE phaseout is more than expected, and/or refinery production expands less than the anticipated one percent per year growth rate.

California must fully explore its options for supplying the state's increasing need for imported motor fuels, including the potential for new or expanded pipeline capacity. New pipeline capacity from the Gulf Coast could conceivably benefit California's motor fuel supply picture in one or more of the following ways:

(1) As a means of continuously supplying part of California's motor fuel market with regular deliveries of petroleum products from Gulf Coast refineries,

(2) As a means of providing replacement supplies from the Gulf Coast for some of the out-of-state markets currently served by California refineries, and

(3) As a contingency supply source to be utilized on a limited basis.

Study Findings

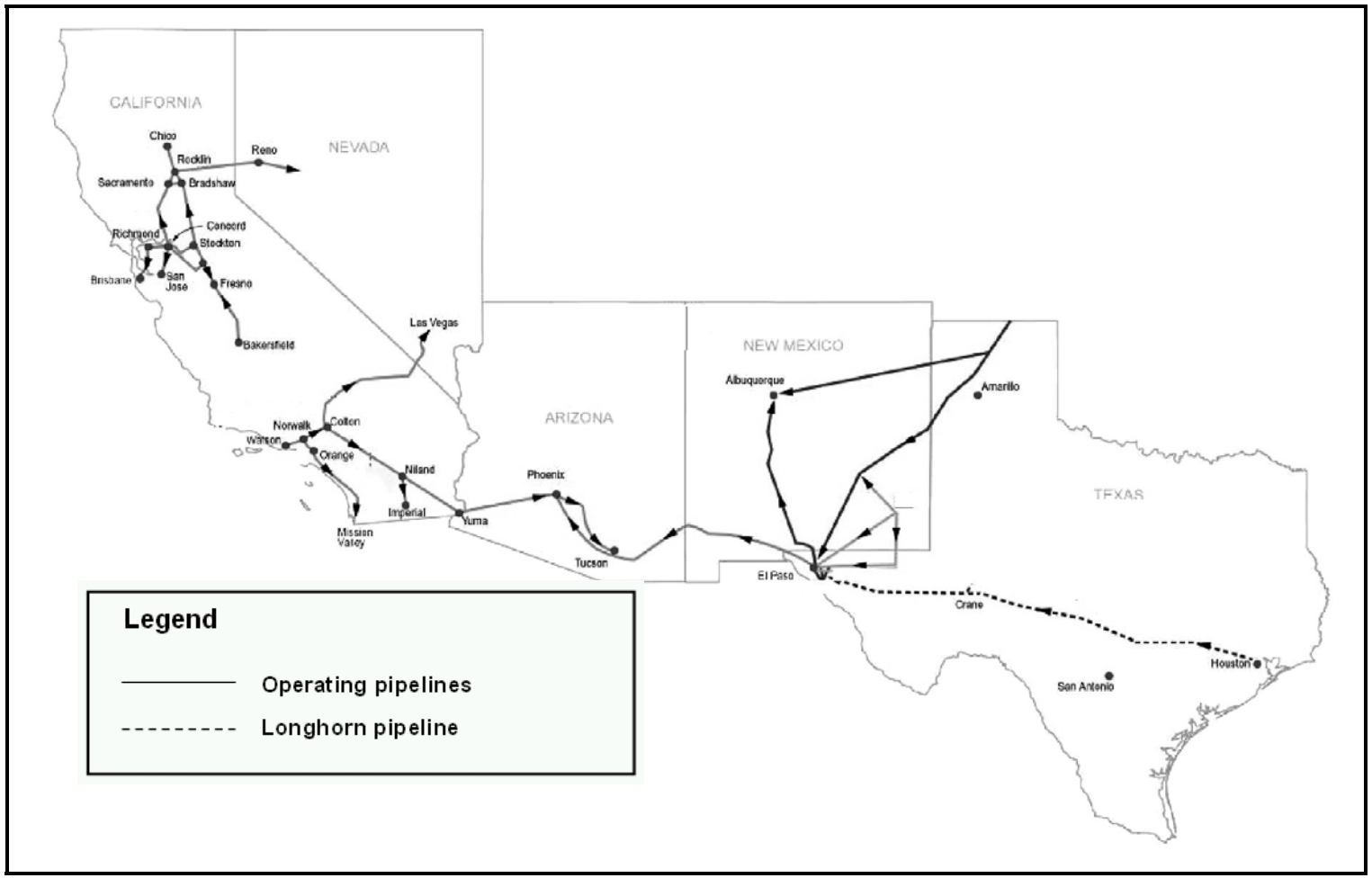
Petroleum product pipelines are often the most economical means of transporting gasoline and other motor fuels from points of production to distant markets. However, such pipelines are capital intensive projects that normally require agreements in advance with a number of shippers to ensure that the pipeline will generate adequate revenue over a 10 to 20 year period to pay for the construction and turn a profit. Also, pipelines engender numerous environmental and safety issues, and the permitting phase of pipeline projects can be extensive and time consuming. From inception to operation, a major new pipeline project such as considered in this study would require at least four years to complete. Moreover, opportunities may exist for expansion and increased use of the existing pipeline network.

Existing Pipeline Systems

The Southwestern United States (California, Nevada and Arizona) contains a number of petroleum product pipelines, as shown in Figure 1. Whether or not any new pipeline is built, operation of this existing pipeline system, including capacity expansions where needed, will be important to adequately supply the region's growing motor fuel markets.

Figure 1

Existing Pipeline Systems



The largest existing system is the one owned and operated by Kinder Morgan, consisting of over 3,400 miles of pipeline. Kinder Morgan is a "common carrier" company that does not own any of the products it ships through its system; rather, it charges a fee (tariff) to operate the pipeline. The Kinder Morgan pipeline system transports California refinery products to Nevada and Arizona, as well as within California. A Kinder Morgan pipeline originating in El Paso, Texas also supplies part of the Arizona market.

The Longhorn Pipeline project is a new pipeline that could be operational during the summer of 2004.[1] This system originates in the refinery region of Houston and terminates in Western Texas (El Paso). Once operational, the Longhorn Pipeline will enable Texas refiners to ship gasoline and diesel fuel to El Paso, where it would be available for local markets and for shipment to other markets in the western states. Initial capacity of this pipeline should be a little more than 70 thousand barrels per day (TBD), with an eventual capacity of over 225 TBD.

California is, and will likely remain, a net exporter of petroleum products, supplying the majority of gasoline and distillates (diesel and jet fuel) to Nevada and Arizona. As demand continues to grow in these three states, California refineries are not expected to be able to supply both local consumption and increased exports to Nevada and Arizona over the next 10 years. Therefore, most of this additional demand will have to be satisfied by a combination of new imports into California and/or increased shipments from Texas refineries.

Issues Associated with a Gulf Coast-to-California Pipeline

The potential merits of a pipeline between the Texas Gulf Coast and California were examined to determine if such a pipeline could be a viable source of additional motor fuel supplies for the state. Three primary factors must be evaluated to determine if the construction and operation of such a pipeline is feasible and economically viable. The first requirement is a constant and sizable increase in demand for petroleum products in California that will not be satisfied with in-state production. The second requirement is an adequate potential supply of complying petroleum products located at the originating point for the pipeline. The third requirement is that the tariff structure of the new pipeline (the charge for transporting products) must be lower than the cost of alternative means of transportation, namely marine vessel freight rates between Texas and California.

As discussed earlier, at least 56 TBD and potentially over 100 TBD of additional gasoline and blending components will need to be imported by California within the next

[1] The Longhorn Pipeline Project has been delayed until adequate financing can be secured to complete the final portion of the construction and purchase sufficient quantities of refined petroleum products to provide the initial fill of the pipeline prior to the commencement of operations. No firm completion date has been announced by the company, Longhorn Partners Pipeline, LP, as of this writing.

several years. The upper range of additional imports could be a sufficient volume to justify the construction of a pipeline between Texas and California, if adequate surplus supplies from Gulf Coast refineries were available.

Few refiners in Texas are currently capable of producing reformulated gasoline or gasoline blending components that can meet California's specifications. In recent years, marine shipments of reformulated gasoline and blending components from Texas to California have only amounted to an average of 10 to 15 TBD. Although it is reasonable to assume that a greater number of refiners will be in a better position to produce California RFG after making modifications to comply with federal low sulfur gasoline standards that begin in 2004, it is unlikely that they will be able to supply at least 100 TBD.

It is also possible that overall gasoline production capacity will decline in the Gulf Coast, as some companies may find it uneconomic to upgrade their facilities to comply with the lower sulfur standards. Demand for gasoline in the entire region is also expected to increase. These factors are likely to diminish availability of surplus gasoline and gasoline blending components that comply with California's tight fuel quality standards.

Meanwhile, it appears likely that gasoline and blending components of suitable quality for use in California's gasoline will also be available from other regions of the world. Foreign imports of reformulated gasoline and blending components to the state averaged a little more than 25 TBD during 2002. After the phaseout of MTBE, the number of foreign refiners capable of producing California reformulated gasoline may decline. The primary reason is that these facilities will be unable to produce the base gasoline that will be used to blend with ethanol. Even so, more blending components will become available from foreign sources if California prices rise to sufficient levels to attract these supplies from their current or alternative markets.

Other petroleum products could potentially be produced on the Gulf Coast for shipment to California, such as diesel fuel. Modifications to comply with 2006 federal low sulfur diesel fuel standards should increase the number of Texas refiners capable of producing low aromatic diesel fuel meeting California's standards. However, even if additional supplies of diesel fuel could be made available in the Gulf Coast, California is not expected to become a large net importer of diesel fuel over the near-term.

The U.S. Jones Act requires that most commodities that are shipped from one domestic port to another be transported on U.S. vessels. There were only 64 petroleum product tankers in the U.S. fleet in 2001. Most of these vessels are in excess of 20 years old and 18 ships are scheduled to be retired from service by 2006.

In light of the rapid retirement schedule for Jones Act tankers and the increasing demand for their services, domestic shipping rates are not expected to decline in the near-term. In fact, scarcity of product tankers, coupled with higher demand, should put upward pressure on these transportation rates. This means that transportation costs from the Gulf Coast to California, which have ranged from 10 to 25 cents per gallon over the last couple of years, would probably be sustained at the higher levels. It is therefore

reasonable to assume that the tariff structure for the pipeline could be less than marine rates as long as the expected daily volume transported through the pipeline is at least 50 TBD.

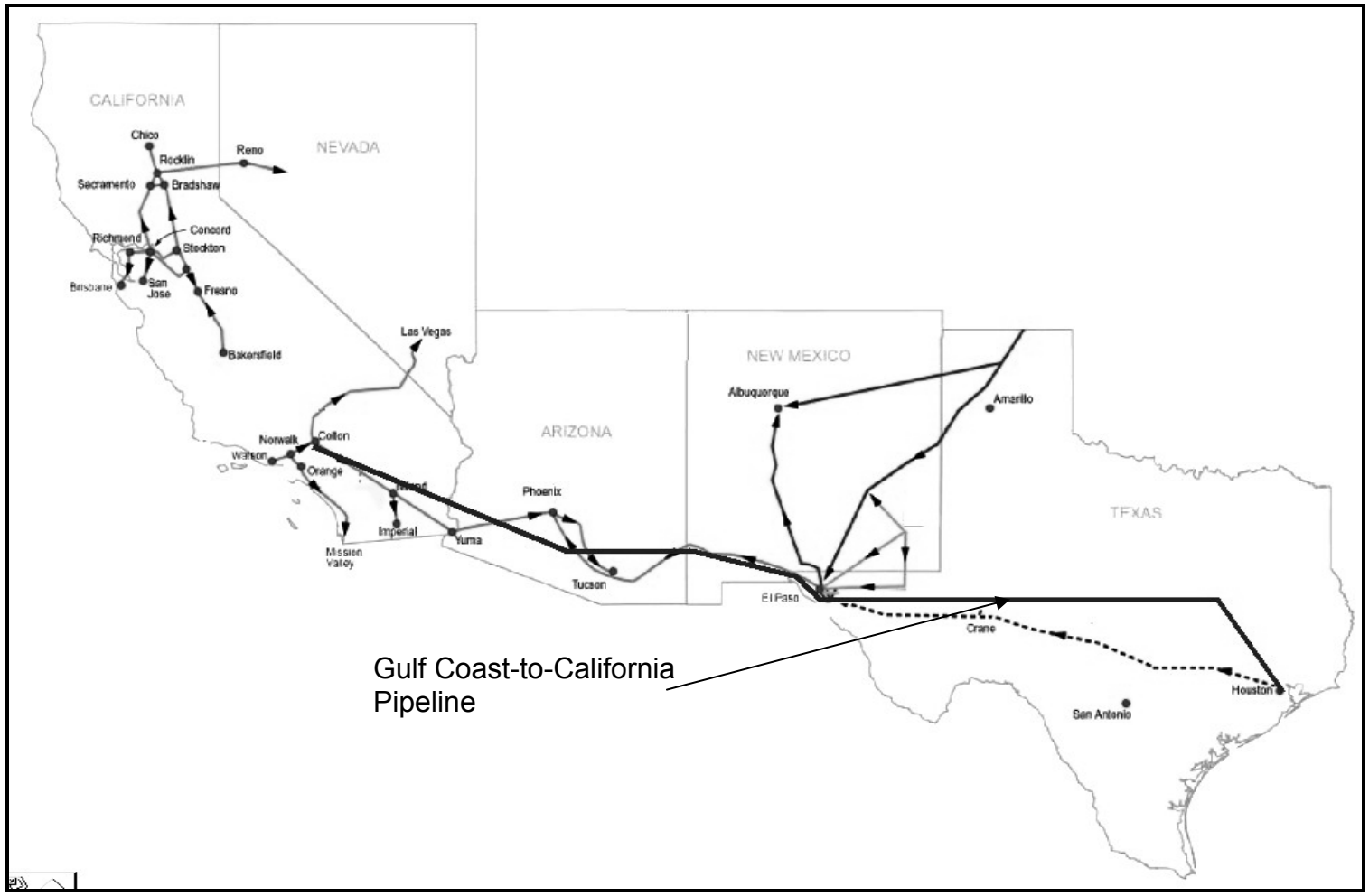
Gulf Coast-to-California Pipeline Features and Cost

A feasibility study was completed for a conceptual pipeline that would run from Galena Park, Texas to Colton, California (see Figure 2). This 1,415-mile, 24-inch diameter pipeline would be capable of delivering up to 150 TBD of gasoline and other fuel products from Houston area refineries to the Kinder Morgan terminal in Colton in the Los Angeles area. A smaller, 12-inch diameter pipeline with a 50 TBD capacity was also studied. Colton was selected as the termination point because it is one of Kinder Morgan's major hubs, from which product can be distributed to numerous Southern California locations and Las Vegas. Also, incremental supply at Colton could eliminate the need for imports from Northern California, thus creating extra supply in the northern half of the state.

The route for the study pipeline generally follows U.S. Highway 10 through Texas, New Mexico, Arizona and California. In Texas, the selected route was extended in a northerly direction to avoid the environmentally sensitive area of the Edwards aquifer and its drainage area. For most of its route, the pipeline follows existing rights-of-way of various existing petroleum and natural gas pipeline segments to help mitigate permitting issues associated with a new pipeline project. Approval of the pipeline routing would involve agencies of all four states and federal agencies such as the Federal Energy Regulatory Commission, U.S. Department of Transportation and U.S Environmental Protection Agency.

The estimated timetable for the pipeline project of four years (following conceptual approval and financing) includes the following elements: engineering and design – 6 months; permitting and material procurement – 18 months; construction and testing – 24 months. This schedule does not account for prolonged delays during the permitting and construction phases, which are often encountered during a project of this magnitude due to landowner disputes,

Figure 2
Gulf Coast-to-California Pipeline Conceptual Route



challenges from special interest groups, or unanticipated cultural and environmental findings.

The total cost for the study pipeline is estimated at $1.6 billion for a 24-inch pipeline and $806 million for a 12-inch pipeline. This is a conceptual "order-of-magnitude" estimate and is based on historical cost data.

An alternative route within California for the pipeline was also examined to assess the possibility of using existing assets for a portion of the product pipeline. The purpose was to determine if capital resources and project timelines could be reduced. The former Four Corners crude oil pipeline between Long Beach and Needles, California was suggested as an alternative route for the conceptual pipeline. This pipeline has been purchased by Questar and could be used to deliver natural gas to California. Since Questar has not initiated a conversion project for this pipeline segment, it could become available for use as a petroleum product pipeline. Although it was concluded that the conversion of this line segment to transport petroleum products has the potential to reduce costs and shorten the construction schedule, various issues were raised that could preclude this alternative as a viable option.

The primary issue regarding this alternative involves concerns raised by the State Fire Marshal regarding the degree of rehabilitation required to make the line suitable for use as a product pipeline. Numerous leaks caused by external corrosion are cited as one concern. Use of an existing pipeline that was constructed in 1959 could pose an environmental risk that would require significant additional investment to mitigate against product release.

Gulf Coast-to-California Pipeline as a Strategic Fuel Reserve

Rather than operating on a continuous basis, a Gulf Coast-to-California pipeline could conceivably fulfill a more limited strategic purpose with intermittent or contingency operations. Operated in this mode, reserve supplies, when needed, would be drawn from the pipeline instead of from in-state storage.

The main problem with this option is the very limited use of the pipeline. Pipelines are normally designed to operate continuously and are shut down only for maintenance activities. Interface mixing and product shelf life are major concerns or constraints for this alternative.

Other Pipeline Projects That Could Indirectly Benefit California's Motor Fuel Supply

Besides a possible Gulf Coast-to-California petroleum product pipeline, several related options were identified that could indirectly improve California's transportation fuel supply/demand balance. There are several cases in which potential pipeline projects outside of California could increase gasoline supplies available to markets within the state.

The existing Kinder Morgan pipeline from El Paso, Texas to Tucson, Arizona appears to be at capacity. The importance of this capacity constraint is that most or all increases in future demand for the Phoenix/Tucson marketing area must be met from deliveries that originate in Southern California. Additional volumes are estimated to be 13 TBD by 2005 and 30 TBD by 2010. These amounts are roughly equivalent to 1.3 to 3.0 percent of California's total gasoline demand.

If this capacity constraint was removed by an expansion of the existing El Paso-to-Phoenix pipeline, additional volumes of product could be shipped from the Gulf Coast, allowing refiners in Southern California to ship less gasoline to Arizona. Kinder Morgan is pursuing the necessary approvals for such an expansion project from Federal Energy Regulatory Commission (FERC). FERC granted the company's petition in part in January 2003, citing that "this action is in the public interest because it will reduce the regulatory burden associated with the construction of additional petroleum product pipeline service in a market where capacity is inadequate". This decision will allow Kinder Morgan to file with FERC on an expeditious basis to increase tariffs on the pipeline segment to reflect the additional $180 million costs associated with the project. Absent any significant permit delays, the work could be completed as early as the end of 2004.

Increased product imports from Texas may become increasingly important for supplying the growing demand in the Southwest markets of New Mexico, Arizona and Nevada, as well as California. The anticipated operation of the previously-discussed Longhorn Pipeline from Houston to El Paso will be instrumental to this increased regional reliance on Gulf Coast production. Operation of the Longhorn Pipeline will enable refiners in Texas to ship additional volumes of petroleum products to El Paso, Texas. Since the capacity of the Longhorn Pipeline is much greater than the demand in the El Paso area, additional volumes could be shipped to the Phoenix/Tucson markets as soon as the pipeline segment between these two locations is expanded. Potential continuation of this pipeline all the way to California would allow refiners in Texas a potential economically attractive option to supply California with gasoline and other petroleum products.

Another potential source of indirect supply for California would be the construction of a new pipeline between Arizona and Las Vegas. Currently, California refineries are the primary source of petroleum products for the Las Vegas region. Gasoline shipments to Las Vegas via two pipelines from Southern California totaled nearly 50 TBD during 2001. The construction of a new pipeline to Las Vegas from Phoenix would open the Las Vegas market to other supply sources, potentially decreasing shipments from Southern California refineries.

The potential for indirect supplies for California could be diminished somewhat by a number of factors. These include decreased refinery capacity and capability in the El Paso region; gasoline specification changes for Arizona; and regional demand increases.

Proponents of the Longhorn Pipeline have surmised that gasoline and other petroleum products could be transported from the Gulf Coast to El Paso at a delivered price less than that of the prevailing El Paso market prices. If this is so, some local refinery capacity in the region could be curtailed as soon as the Longhorn Pipeline begins deliveries to the El Paso market. It is unknown at this time if the potential magnitude of this refinery capacity decline will be significant. Further, there has not been an assessment of the potential for refinery upgrades to produce cleaner gasoline and blending components. Both of these issues, beyond the scope of this study, could impact the potential for indirect supply of gasoline and blending components for California.

Arizona's gasoline regulations currently allow suppliers from the Gulf Coast and California to supply the Phoenix market with gasoline that is similar to Federal RFG or California Phase 2 RFG specifications. If Arizona decides to modify their existing gasoline specifications to be identical or similar to California Phase 3 RFG standards on a year-round basis, the quality of gasoline will be cleaner and more difficult to produce. This scenario would decrease the number of refiners capable of meeting the tighter specifications, potentially reducing the capability of refiners on the Gulf Coast to increase gasoline shipments to the Phoenix markets even if the El Paso-to-Phoenix pipeline capacity was expanded.

Gasoline demand in Western Texas, New Mexico and Arizona is expected to continue growing at a rate equivalent to population growth, at least 2.5 percent per year. This continued growth equates to between 10 and 20 TBD of additional gasoline demand per year. The majority of this incremental demand is located in the Phoenix/Tucson markets. Thus, more supply capacity will be needed, in any case, to serve the growing demand of this region, and new or expanded pipeline capacity will not necessarily yield a proportionate reduction in deliveries from California suppliers.

Conclusions and Recommendations

Construction and operation of a petroleum product pipeline between the Gulf Coast and California does not appear to be a viable option to increase gasoline and blending component supplies to California in the foreseeable future. There do not appear to be adequate supplies of gasoline or gasoline blending components of sufficient quality available in the Gulf Coast to provide the volumes necessary to merit construction of a pipeline. California's need for diesel fuel imports is also not expected to become large enough to warrant a pipeline. Therefore, pursuit of a Gulf Coast-to-California pipeline by the State of California is not recommended at this time.

Expansion of pipeline capacity between Texas and Arizona would increase the ability to supply the Phoenix/Tucson markets from the Gulf Coast. This would provide an opportunity for California refiners to supply less of this market,

indirectly increasing gasoline supplies for California. Therefore, the State of California should support the proposed capacity expansion of the existing Kinder Morgan pipeline from El Paso to Phoenix, although California's financial participation in this project is not recommended or seen as needed.

If a new petroleum product pipeline was constructed between Phoenix and Las Vegas, a portion of the Las Vegas market could be supplied from refineries located on the Gulf Coast. This assumes that the Longhorn Pipeline is operational and that the pipeline capacity between El Paso and Phoenix has been increased to permit additional petroleum product shipments to Las Vegas. The State of California should, therefore, support the construction of a new product pipeline from Phoenix to Las Vegas to enable petroleum product deliveries from Texas. Again, financial participation by California in such a project is not deemed necessary or prudent.

Completion of the Longhorn Pipeline will be a key step toward enabling greater reliance on Gulf Coast refineries for increased (direct or indirect) supply of motor fuels to California. The State of California should encourage the completion and operation of this pipeline.

Further analysis should be conducted to better quantify the potential loss of refinery production capacity in Western Texas and New Mexico and the implications for the potential to indirectly increase gasoline supplies for California.

Further analysis should also be conducted to assess the impacts of Arizona adopting Phase 3 RFG and the implications for the potential to indirectly increase gasoline supplies for California.

Federal government agencies with lead permit authority for interstate petroleum pipeline projects (such as the Department of Transportation and the Environmental Protection Agency) should examine the feasibility of streamlining their review and approval processes to reduce the time required to issue the necessary permits. Lengthy permit processes are one of the main factors that discourage successful initiation of needed pipeline projects.